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ARTICLES

Identification of multiple T cell epitopes on Bet v I, the major birch pollen allergen, using specific T cell clones and overlapping peptides

C Ebner, Z Szepfalusi, F Ferreira, A Jilek, R Valenta, P Parronchi, E Maggi, S Romagnani, O Scheiner and D Kraft

Institute of General and Experimental Pathology, University of Vienna, Austria.

Eleven T cell clones (TCC) with specificity for Bet v I were established from the peripheral blood of six birch pollen allergic donors. Bet v I is the major allergen of birch (Betula verrucosa) pollen and shows high homology to the major allergens of pollens of other trees within the order fagales (hazel, alder, hornbeam, oak, etc.), which represent important inhalant allergens in the northern hemisphere. The TCC were shown to react with purified natural, as well as with purified recombinant Bet v I. All clones showed the helper cell phenotype (CD3+CD4+) and expressed the TCR-alpha/beta. The cytokine production pattern in response to stimulation with allergen resulted in enhanced production of IL-4 in 9 of 11 clones. The clones were used for T cell epitope mapping on the Bet v I molecule. For this purpose, peptides with a length of 12 amino acids each and overlapping for 10 residues were synthesized following the amino acid sequence of Bet v I. These 75 peptides were used to stimulate Bet v I-specific T cell clones. Our experiments revealed 7 distinct T cell epitopes on the Bet v I molecule. The epitopes were scattered over the whole molecule, 2 sequences were in agreement with an algorithm previously described for the prediction of T cell epitopes. In 3 cases, we could identify distinct TCC specificities within single individuals. Furthermore, for each donor, none of the peptides representing epitopes for TCC inhibited the binding of IgE antibodies to Bet v I. These results suggest that T cells and IgE antibodies from the same individual recognize different structures on the Bet v I allergen.

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